

WHAT IS CLAIMED IS:

- 1 1. An apparatus for supplying a chemical solution to a
- 2 chemical injection part in a semiconductor manufacturing process,
- 3 comprising:
- 4 a chemical solution supply source;
- 5 a feed line in which the chemical solution is supplied from the
- 6 chemical solution supply source to the chemical solution injection part
- 7 using a pressure of the chemical solution supply source; and
- 8 means for measuring/controlling a flow rate of the supplied
- 9 chemical solution, the measuring/controlling means being mounted in
- 10 the feed line,
- 11 wherein the feed line comprises:
- 12 a recycle line for preventing coagulation of the chemical
- 13 solution, the recycle line being connected to the chemical solution
- 14 supply source; and
- 15 a branch line branching from the recycle line, the branch line
- 16 being connected to the chemical solution injection part, and
- 17 wherein the means for measuring/controlling the flow rate of
- 18 the supplied chemical solution comprises:
- 19 a flow rate control valve;
- 20 a detector for detecting the flow rate of the chemical solution
- 21 and generating a flow rate data signal, the detector being mounted in
- 22 the feed line of the flow rate control valve; and
- 23 a controller for receiving the flow rate data signal and
- 24 comparing the flow rate data signal with a reference flow rate data
- 25 signal in order to output a control signal for controlling a degree of
- 26 opening the flow rate control valve.

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1 2. An apparatus as claimed in claim 1, wherein the
2 controller comprises a proportional integral derivative (PID) automatic
3 controller.

1 3. An apparatus as claimed in claim 1, wherein the
2 controller further comprises a display device for displaying the
3 measured flow rate and an alarm device for warning an operator that
4 the measured flow rate is different from a required flow rate.

1 4. An apparatus as claimed in claim 1, wherein the
2 chemical injection part is included in a polishing apparatus having a
3 rotate-able turntable and a polishing pad.

1 5. An apparatus as claimed in claim 1, wherein the
2 chemical solution is a slurry comprising one or more from the group
3 consisting of a reaction reagent, friction particles, and a chemical
4 reaction catalyst.

1 6. An apparatus for supplying a chemical solution to a
2 chemical injection part in a semiconductor manufacturing process,
3 comprising:
4 a plurality of chemical solution supply sources, each source
5 supplying a different chemical solution;
6 a plurality of feed lines into which the chemical solutions are
7 injected from the chemical solution supply sources to the chemical
8 injection part by a pressure of the chemical solution supply sources;
9 and

10 a means for measuring/controlling flow rates of the chemical
11 solutions supplied to the chemical solution injection part, the means for
12 measuring/controlling flow rates being mounted in each of the feed lines.

1 7. An apparatus as claimed in claim 6, wherein the
2 chemical solutions are mixed with each other just before being supplied
3 to the chemical solution injection part.

1 8. An apparatus as claimed in claim 6, wherein each
2 one of the plurality of feed lines further comprises:

3 a recycle line for preventing coagulation of the chemical
4 solution, the recycle line being connected to an associated chemical
5 solution supply source; and

6 a branch line branching from the recycle line, the branch line
7 being connected to an associated chemical solution injection part.

1 9. An apparatus as claimed in claim 8, wherein the
2 branch lines of each one of the plurality of feed lines are coupled by a
3 coupling part to a single line just before supplying the chemical
4 solutions to the chemical solution injection part, and

5 wherein the coupling part is adjacent the chemical solution
6 injection part.

1 10. An apparatus as claimed in claim 9, further
2 comprising a mixer for mixing the chemical solutions with each other,
3 the mixer being installed at the coupling part.

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1 11. An apparatus as claimed in claim 6, wherein each
2 one of the plurality of chemical solutions comprises one or more from
3 the group consisting of a polishing agent, a chemical additive mixed
4 with the polishing agent, and de-ionized (DI) water.

1 12. An apparatus as claimed in claim 6, wherein each of
2 the measuring/controlling means comprises:

3 a flow rate control valve;

4 a detector for detecting the flow rate of the associated
5 chemical solution, the detector being mounted in the feed line of the
6 flow rate control valve; and

7 a controller for receiving a flow rate data signal and
8 comparing the flow rate data signal with reference flow rate data signal
9 in order to output a control signal for controlling a degree of opening
10 the flow rate control valve.

1 13. An apparatus as claimed in claim 12, wherein the
2 controller comprises a proportional integral derivative (PID) automatic
3 controller.

1 14. An apparatus as claimed in claim 12, wherein each
2 one of the controllers further comprises a display device for displaying
3 the measured flow rate and an alarm device for warning an operator
4 that the measured flow rate is different from a required flow rate.

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1 15. An apparatus as claimed in claim 6, wherein the
2 chemical solution injection part is included in a polishing apparatus
3 having a rotate-able turntable and a polishing pad.

1 16. A method of supplying chemical solutions using the
2 apparatus claimed in claim 6, comprising the steps of:
3 respectively providing a pressure to a plurality of chemical
4 solution supply sources;
5 respectively carrying chemical solutions from the chemical
6 supply sources to a plurality of feed lines using the pressure; and
7 respectively measuring/controlling flow rates of the chemical
8 solutions carried through the feed lines.

1 17. A method of supplying chemical solutions as claimed
2 in claim 16, further comprising a step of mixing the measured/controlled
3 chemical solutions just before supplying the chemical solutions to the
4 chemical solution injection part.

1 18. A method as claimed in claim 16, wherein the step of
2 respectively measuring/controlling the flow rates comprises the steps
3 of:

4 detecting flow rates of chemical solutions flowing into the feed
5 lines and generating flow rate data signals indicating the detected flow
6 rates of each respective chemical solution;

7 receiving flow rate data signals indicating the detected flow
8 rates of each respective chemical solution and comparing the flow rate
9 data signals with reference flow rate data signals in order to output
10 control signals for controlling flow rate control valves of each respective
11 chemical solution; and

12 controlling the flow rate control valves by means of the control
13 signals to control the flow rate of the chemical solutions.

1 19. A method as claimed in claim 18, further comprising a
2 step of displaying the measured flow rates.

1 20. A method as claimed in claim 18, further comprising a
2 step of generating an alarm for warning an operator when any
3 measured flow rate exceeds a permissible error range of a required flow
4 rate.

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